MTU400

Suggested V.35 Stub cable

15 way D type connector Male	Name	Type	MRAC 34 pin Female
1	Protective Ground	-	Shield
8	Signal Ground	Bidirectional	B
15	RTS (Flag 3 I/P)	V.28 Input	C
7	ExtClk(A)	V.11 Input	U
14	ExtClk(B)	V.11 Input	W
6	RXClk(A)	V.11 Output	V
13	RXClk(B)	V.11 Output	X
5	TXClk(A)	V.11 Output	Y
12	TXClk(B)	V.11 Output	AA
4	RX(A)	V.11 Output	R
11	RX(B)	V.11 Output	T
3	CTS (Flag 1 O/P)	V.28 Output	D
10	DSR (Flag 2 O/P)	V.28 Output	E & F
2	TXD(A)	V.11 Input	P
9	TXD(B)	V.11 Input	S

Xchange interface adapter

Introduction

Xchange is an interface adapter that will convert between a G.703/G.704 link and an X.21/V.11 or V.35 interface (configured with internal jumpers). The Xchange can operate at DCE rates between 64Kbps and 2048Kbps in 64k steps and may be assigned to non-contiguous timeslots on a G.704 link. An external clock input is provided on the DCE port to enable the Xchange to be clocked from the connected DTE. Configuration is achieved simply using the buttons and LCD display on the front panel. Configuration is Non Volatile and will be retained in the event of power failure.

Approvals

Certified compliant in the EC, when fitted in accordance with the installation instructions, against the following directives/standards:

Low Voltage Directive (73/23/EEC and amendment 93/68/EEC)
EN60950 : 1992/A5:1998 (Safety)
Electromagnetic Compatibility directive (89/336/EEC and subsequent amendments to date)
EN300386 : 2000-03 (V1.2.1)
Telecommunications Terminal Equipment directive (91/263/EEC and amendment 93/68/EEC)
CTR 12, 13, PD7024

Warnings

This equipment must be earthed/grounded via the screen of the DTE lead. This equipment relies on the earth/ground connection for EMC compliance. It must not under any circumstances be operated without an earth connection, which could nullify its approval.

The equipment allows connection only of suitably approved equipment to its ports, the safety status of which are defined below.

SELV Ports

DC Power
'To DTE'

The above named ports are classified as SELV (Safety Extra Low Voltage) in accordance with clause 2.3 of EN60950 (BS7002, IEC950 as applicable) and must only be connected to equipment which similarly complies with the SELV safety classification. The DC power port must only be connected to the supplied power module.

TNV Ports

Euro 120 Ohm RJ45
75 Ohm BNC

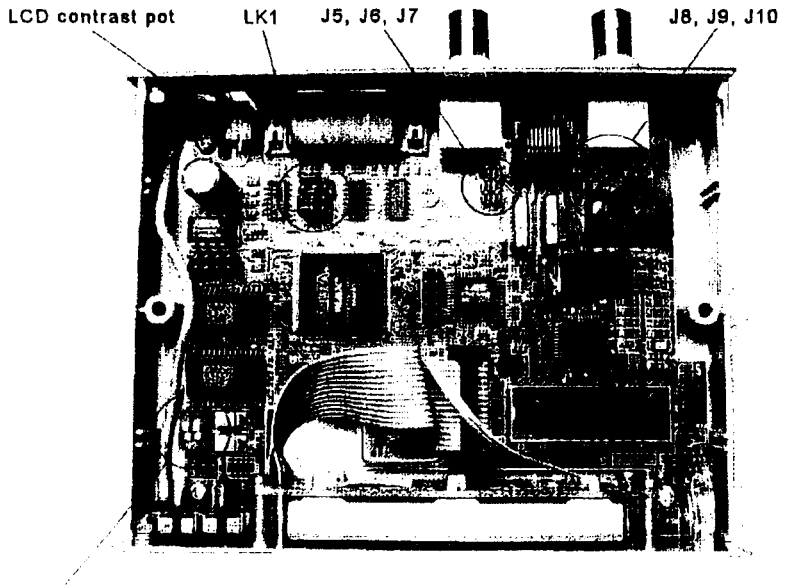
The above named ports are classified as TNV (Telecom Network Voltage) in accordance with clause 6 of EN60950 (BS7002, IEC950 as applicable), and must only be connected to equipment that similarly complies with the TNV safety classification.

Jumper Settings

The following jumpers are used to select the E1 and Nx64 interface types of the unit.

LK1	Bank of 4 Jumpers. Select V.11 or V.35 signal levels When V.35 is selected, the V.35 stub adapter cable should be used.
J5 J6	Fit to connect E1 Tx signal to BNC These jumpers should only be fitted if the E1 service is to be run over BNC cabling
J8 J10	Fit to connect E1 Rx signal to BNC These jumpers should only be fitted if the E1 service is to be run over BNC cabling
J7	Fit to Earth outer conductor of Tx BNC These jumpers should only be fitted if the E1 service is to be run over BNC cabling *
J9	Fit to Earth outer conductor of Rx BNC These jumpers should only be fitted if the E1 service is to be run over BNC cabling *
Dipswitch 2	When set On, the unit may not be configured from the front panel display and buttons. The initial splash screen when the unit is turned on will also state 'Locked'. This can be used after initial configuration to prevent unauthorised changes. Please note debug options may still be selected even when this switch is set.
Dipswitch 1	Reserved. Should be left in the Off position.

* Incorrect earthing will cause problems. The Tx and Rx cables should only be earthed at one end. It is recommended that the Tx only at each end of the link be earthed.



X.21/V.11 DCE Pinout - 15 Way D Type Female configured as DCE

(Only applicable when LK1 is set to V.11 position)

Data Channel Connections

Name	Description	Type at Connector	DCE – DB15 Female
Protective Ground		-	1
G	Signal Ground	-	8
T(A)	TxDa	Input	2
T(B)	TxDb	Input	9
R(A)	RxDa	Output	4
R(B)	RxDb	Output	11
S(A)	Clock a	Output	6
S(B)	Clock b	Output	13
I(A)	Indicate a	Output	5
I(B)	Indicate b	Output	12
C(A)	Control a	Input	3
C(B)	Control b	Input	10
X(A)	Ext Clock a	Input	7
X(B)	Ext Clock b	Input	14

V.35 DCE Pinout – 15 Way D Type Female configured as DCE

(Only applicable when LK1 is set to V.35 position)

Data Channel Connections

Number	Name	Type at Connector	DCE – DB15 Female
-	Protective Ground	-	1
102	Signal Ground	Bidirectional	8
*	Flag 3 I/P	V.28 Input	15
113	ExtClk(A)	V.11 input	7
113	ExtClk(B)	V.11 input	14
115	RXClk(A)	V.11 Output	6
115	RXClk(B)	V.11 Output	13
114	TXClk(A)	V.11 Output	5
114	TXClk(B)	V.11 Output	12
104	RX(A)	V.11 Output	4
104	RX(B)	V.11 Output	11
**	Flag 1 O/P	V.28 Outout	3
**	Flag 2 O/P	V.28 Output	10
103	TXD(A)	V.11 Input	2
103	TXD(B)	V.11 Input	9

* Input flag can be configured to be any V.28 input (to DCE) i.e. Request to Send RTS (105)

** Output flags can be configured to be any V.28 outputs (from DCE) i.e. Clear to Send CTS (106), Data Set Ready DSR (107) or Data Carrier Detect DCD (109)

Status LEDs

The Blue Status LED illuminates when the unit is synchronised and has no alarm condition. If the unit is not synchronised the Blue LED will flash. If an alarm condition occurs the Red LED will illuminate. If any of the diagnostics options are enabled the Amber LED will illuminate.

G.703 Interface Pinouts

Composite Interface Connections (Europe) Using 120 Ohm Balanced RJ45

Name	Description	Type at Connector	DTE – RJ45 Female
RxA	RX Pair	Input	1
RxB	RX Pair	Input	2
TxA	TX Pair	Output	4
TxB	TX Pair	Output	5
S1	Shield Reference	-	3
S2	Shield Reference	-	6

Composite Interface Connections (UK) Using 75 Ohm Un-Balanced BNC

Name	Description	Type at Connector	DTE – BNC Female
RxA	RX Pair	Input	Centre RX
RxB		Ground Reference	Outer RX
TxA	TX Pair	Output	Centre TX
TxB		Ground Reference	Outer TX

Configuration

Four buttons are provided for configuration. (Up (▲), Down (▼), Ok (✓), Cancel (x)). Up and Down move between configuration items, or alter a configuration item if it is selected. Ok selects a configuration item or confirms changes. Cancel quits out of a configuration item discarding any changes. When modifying the timeslot allocations, Up and Down move between timeslots, Ok toggles the timeslot as enabled or not, Cancel brings up a second display requesting confirmation of changes.
Please note that the diagnostics settings do not get stored in Non volatile memory and will always revert to disabled on power up.

Top Level Configuration items (Not user alterable)

Sync State	Reports the Synchronisation state of the E1 Interface.
No Signal	DC level on receive
Clock Only	No framing detected (G.703)
Framed	Framing detected. No valid multiframe information (Non CRC4 mode).
Multiframe	Multiframe detected.
Transmit Signal	Detected condition of E1 Transmit signal.
Open Circuit	No load on Transmit (Cable fault)
Normal	Normal load on Transmit
Short Circuit	Short circuit on Transmit (Cable fault)
Receive Signal	Level of E1 received signal Ranges from Low Loss (better than -2.5dB) to No signal (less than -37.5dB) in -2.5dB steps.
Data Rate	Data rate of the X.21/V.35 port as configured under Timeslot.
Interface	Data port interface selected (Via internal jumpers)
X.21	X.21/V.11 signal levels selected
V.35	V.35 signal levels selected – Use with V.35 stub adapter cable
Control	Status of X.21 Control lead. (Not available if V.35 interface is selected)
On	Signal is asserted
Off	Signal is not asserted
Flag 3	Status of V.35 Flag 3 lead. (Not available if X.21 interface is selected)
On	Signal is asserted
Off	Signal is not asserted
BPV error rate	Running average of Bipolar Violation errors over a one minute period
CRC error rate	Running average of CRC errors over a one minute period
FEBE error rate	Running average of FEBE errors over a one minute period
Config	Provides entry to config level Configuration items.

Config Level Configuration items

Timeslot	Enable or Disable individual timeslots. Enabling timeslot 0 forces Transparent (G.703) mode.
E1 Clk Source	Clock source of E1 Transmit signal
Loop*	Transmit clock recovered from network receive signal
Internal	Transmit clock generated by an internal 2048Kbps crystal oscillator
Nx64	Transmit clock derived from DCE port clock When connected to a clocked network, both units should be configured to Loop clock. When connected via a crossover cable one unit should Loop clock and the other source the clock Internally. When the system master clock is one of the DCE devices, the connected unit should set Clock source to Nx64 and the other unit to Loop clock. In this instance Tx Clk Source and/or Rx Clk Source will need to be set to external
Impedance	E1 Line Impedance
75 Ohm	The normal Impedance for BNC connection
120 Ohm*	The normal Impedance for RJ45 connection

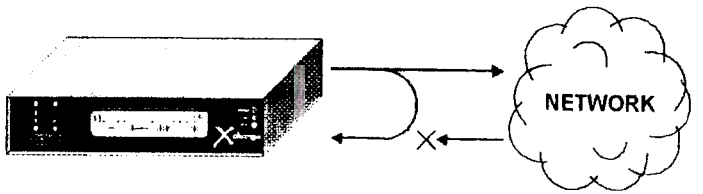
CRC4 Enabled* Disabled	Selects whether CRC4 information is generated in a G.704 multiframe. Not applicable if running in transparent (G.703) mode.
Tx Clk Source Internal* External	DCE interface Transmit clock source. Clock is derived from E1 Receive clock. Clock is provided by external device. If this external device is generating the clock rather than looping its received clock, the E1 Clk Source must be set to Nx64.
Rx Clk Source Internal* External	DCE interface Receive clock source. Clock is derived from E1 Receive clock. Clock is provided by external device. If this external device is generating the clock rather than looping its received clock, the E1 Clk Source must be set to Nx64.
Tx Clk Edge Normal* Inverse	Sets which edge of Tx Clock is used to clock in data. This should be left as Normal unless cable length delays are causing the clock to become inverted with respect to the data
Indicate Lead On* Off Follow Ctrl Carrier	Determines source of X.21 Indicate lead (Not available if V.35 interface is selected) Signal is always asserted Signal is never asserted Signal is the same state as the Control signal Signal is asserted only if the E1 interface is considered Synchronised
Flag 1 On* Off Follow Flag 3 Carrier	Determines source of V.35 Flag 1 lead (Not available if X.21 interface is selected) Signal is always asserted Signal is never asserted Signal is the same state as the Flag 3 signal Signal is asserted only if the E1 interface is considered Synchronised
Flag 2 On* Off Follow Flag 3 Carrier	Determines source of V.35 Flag 2 lead (Not available if X.21 interface is selected) Signal is always asserted Signal is never asserted Signal is the same state as the Flag 3 signal Signal is asserted only if the E1 interface is considered Synchronised
Carrier Alarm Enabled* Disabled	Determines whether loss of Synchronisation on the E1 interface creates an alarm condition.
Data Alarm Enabled Disabled*	Determines whether the Control signal (X.21) or Flag 3 signal (V.35) being disasserted creates an alarm condition.
Backlight Timed* On Off	Determines behaviour of LCD Backlight Backlight turns on when a key is pressed and off 30 seconds after the last key is pressed Backlight is always on Backlight is never on
Elink1 mode Enabled Disabled*	When enabled, the Xchange acts as a master to an Elink 1, putting Elink 1 configuration information in timeslot 31 (if unused). Only contiguous timeslot allocation will be allowed when enabled
Diagnostics	Provides entry to Diagnostics level Configuration items.

* Factory default setting

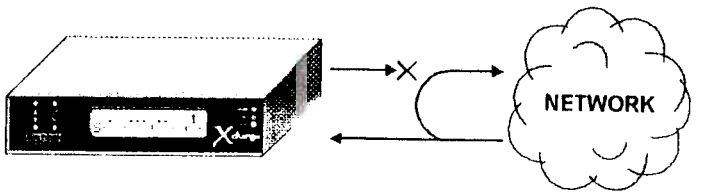
Diagnostics Level Configuration Items

Local Loop enable disable	When enabled, the E1 Transmit signal will be looped to the E1 Receive signal
Network Loop enable disable	When enabled the E1 Receive signal will be looped to the E1 Transmit signal
Remote Loop enable disable	When Enabled, the standard Loop up code (repeating 10000) will be sent to the remote for 10 seconds. When Disabled, the standard Loop down code (repeating 100) will be sent to the remote for 10 seconds. When receiving either of these codes for > 5 seconds a unit will enter or leave Network Loop mode as appropriate. Please note that these codes are sent as an unframed G.703 2Mbps bitstream and so will not work through a framed network.
G.703 Bert enable disable	When enabled, a standard PRBS (pseudo random bit sequence) is generated as a G.703 2Mbps bitstream and sent to the remote. This PRBS is searched for in the received bitstream. The real time results are displayed on the BERT configuration screen in the bottom right corner showing a letter S if synchronised to an incoming PRBS and a 4 digit Hex number displaying the number of bit errors counted. This will saturate at FFFF. Please note that the PRBS is sent as an unframed G.703 bitstream and so will not work through a framed network.

Local loop



Network Loop



Remote loop